

WHAT IS CLAIMED IS:

1. A scanning exposure apparatus which exposes a substrate by moving a mask and the substrate, the apparatus comprising:

a projection unit;

a stage system having a first stage on which one of the mask and the substrate is held, a second stage on which the other is held, a first driving system for the first stage, and a second driving system for the second stage, the first stage and the second stage being moved in respective scanning directions, the first stage being moved at a first scanning speed during scanning exposure, the second stage being moved at a second scanning speed during the scanning exposure, the first scanning speed being different from the second scanning speed in accordance with a projecting magnification of the projection unit;

an interferometer system having a first interferometer which monitors the first stage and a second interferometer which monitors the second stage;

a first reference mirror provided on the projection unit, the first reference mirror being used for the first interferometer; and

a second reference mirror provided on the projection unit, the second reference mirror being used for the second interferometer; and

a controller associated with the stage system and the interferometer system, the first stage being moved in accordance with a deviation, obtained by using the interferometer system, between the first stage and the second stage in a direction other than the scanning direction during the scanning exposure.

2. A scanning exposure apparatus according to Claim 1, wherein the first interferometer detects yawing information of the first stage and the second interferometer detects yawing information of the second stage during the scanning exposure.

3. A scanning exposure apparatus according to Claim 2,

wherein the direction other than the scanning direction includes a rotational direction.

4. A scanning exposure apparatus according to Claim 3, wherein the first stage holds the mask.

5. A scanning exposure apparatus according to Claim 4, further comprising a supporting member which supports the first stage and the projection unit.

6. A scanning exposure apparatus according to Claim 3, wherein the first stage holds the substrate.

7. A scanning exposure apparatus according to Claim 6, further comprising a supporting member which supports the second stage and the projection unit.

8. A scanning exposure apparatus according to Claim 3,

further comprising:

an optical member which defines a rectangular area via which an illumination light irradiates the mask; and

an illumination system disposed between the mask and the optical member, which forms an enlarged image of the rectangular area defined by the optical member.

9. A scanning exposure apparatus according to Claim 8, further comprising a mirror, wherein the illumination system includes a first optical system and a second optical system, and the mirror is disposed between the first optical system and the second optical system.

10. A scanning exposure apparatus according to Claim 9, wherein the projection unit includes a projection optical system and a barrel for holding the projection optical system.

11. A device manufacturing method including a

lithography process in which a substrate is exposed with an image of a pattern formed on a mask, the method comprising:

providing one of the mask and the substrate on a first stage;

providing the other of the mask and the substrate on a second stage;

projecting the image onto the substrate by a projection unit;

moving the first stage and the second stage synchronously in respective scanning directions during scanning exposure, wherein the mask is moved at a first scanning speed, the substrate is moved at a second scanning speed different from the first scanning speed;

monitoring, during the scanning exposure, the first stage by using a first interferometer system which uses a first reference mirror provided on the projection unit;

monitoring, during the scanning exposure, the second stage by using a second interferometer system which uses a second reference mirror provided on the projection unit;

obtaining a deviation between the first stage and the second stage based on output of the first and second interferometers during the scanning exposure; and

moving the first stage in a direction other than the scanning direction based on the obtained deviation during the scanning exposure.

12. A method according to Claim 11, wherein the first interferometer system detects yawing information of the first stage and the second interferometer system detects yawing information of the second stage during the scanning exposure.

13. A method according to Claim 12, wherein the direction other than the scanning direction includes a rotational direction.

14. A method according to Claim 13, wherein the first

stage holds the mask.

15. A scanning exposure apparatus according to Claim 13, wherein the first stage holds the substrate.